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THE LIFE HABITS OF *CEPHUS CINCTUS* NORT. IN MANITOBA.*

BY NORMAN CRIDDLE,

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The problem of controlling the Western Wheat-stem Sawfly, *Cephus cinctus*, is still an acute one in the Prairie Provinces. The insect is now found over more than half the wheat-growing area of Manitoba; its range is very wide in Saskatchewan and it has been found to be present over quite an extensive territory in Alberta.

During the year 1922 the infestation was particularly severe, it being by no means uncommon to find fields of wheat with ninety per cent. of the stems attacked. Indeed, thousands of acres were similarly infested and countless millions of larvae remain in the stubble at the present time which will develop into adults next June, preparatory to attacking the new crop.

Much has already been written concerning this sawfly, but as further observations were made during 1922 in which additional information was obtained, it seems well to review the more important facts of the insect's life-history at this time.

The following summary shows the life cycle of the insect as it occurred in 1922:

| | | |
|------------------|---------|----------------------|
| Pupation began | May 20 | completed May 28. |
| Adults appeared | June 9 | abundant by the 12th |
| Mating began | June 10 | general by June 12 |
| Egg laying began | June 12 | general by June 14. |

In seeking a spot in which to place her eggs, the adult female sawfly runs actively up and down the stem with her head close to it as if making a careful examination for the right place; finding a likely one, she faces downward, and drawing her abdomen under her, thrusts her saw-like ovipositor into the stem in order to locate a hollow. Should this not be present, she tests other places until eventually, finding one that suits, she deposits an egg within the stem—a shiny, cylindrical white object, not very easily seen. In depositing eggs, a preference is shown for a situation around the topmost joint, but it frequently happens that there is no hollow at this point, in which case a lower position is selected. Thus there may be eggs in any portion of the stem. There appears to be an attempt of individual flies to place only one egg in a stem, but after searching among the neighboring herbage it is not an uncommon occurrence for the insect to return to the original plant and place another egg in it. The process of egg-laying only takes a few seconds, though the time occupied in seeking a suitable place may take several minutes. On one occasion an individual was seen to thrust her

*—Contribution from the Division of Field Crop and Garden Insects, Entomological Branch, Dept. of Agric., Ottawa.

ovipositor into a stem fourteen times, seven times almost exactly in the same spot. Eventually, after nine minutes, she placed an egg just above the top joint.

Apparently there is no limit to the number of eggs that may be deposited in a single stem by a series of sawflies, as each is unconscious of the ones that preceded it. It is a common event to find two or more, and I have twice located thirteen eggs in one stem. Thus it happens, as is so often the case in nature, that many are sacrificed for the sake of one, for of all the eggs that are deposited and of the larvae that hatch from them, but one survives.

The selection of suitable plants for egg-laying is governed by the state of growth of the plants. First of all it is necessary that there should be a hollow place in the stem in which to place the egg; secondly, a stem is desired that is succulent in order that the sawfly may work her ovipositor in easily, and of a kind which provides the larva with tender food. Reasonably well advanced wheat is generally in exactly the right condition for oviposition, but when wheat is not ready the flies seek other plants instead. It is largely on this account that fall rye is often heavily infested with eggs. Two native grasses, *Agropyron smithii* and *A. richardsoni*, which constituted two of the original host plants, are always heavily attacked. I have found no exception to the rule that any plant of the grass family provides a harbor for eggs supposing it is in the condition specified above. We found in 1922 that oats, both wild and cultivated, which were supposedly immune, contained eggs when the plants were sufficiently advanced and early sown barley was severely infested.

While the female sawfly shows little discrimination in placing her eggs within the various stems, it is an interesting fact that some of these plants are quite unsuitable to larval development. Brome grass, for instance, is particularly utilized for ovipositing in, but of the larvae thus started on their career, not more than one per cent, on an average, attain maturity. Oats are still more resistant, and we have yet to find mature larva in their stems. It is interesting to note that the causes for the high death rate in oats and brome grass are partly due to different factors. In oats, the cause seems to be excessive sap which drowns the larvae, while in brome grass there is a combination of causes among which are parasites, but more usually it is the late ripening of the stems, which seems to mystify the larvae as to when and where to cut them, so that in many cases they die without doing so at all.

Of the numbers of larvae that frequently hatch in a stem, the first to do so generally survives. This larva quickly tunnels the plant, and as it does so, destroys any eggs or larvae that may be met with. As a rule the lowest situated larva seems to have an advantage over those higher up. It is quite a frequent event to find two or more larvae in a stem, but these, after the first week or two, are always separated by a joint, and so soon as this partition is tunnelled, the stronger larva destroys the other.

Larvae in feeding work both up and down. They may attain the base of the plant in eight days, but they soon work up again, and it is not until the end of July that they are ready to sever the stem and go into winter quarters. It is at this stage that a very important factor comes into play insofar as the farmer is concerned. While the larvae are ready to sever the stems in late

July, they are governed in doing so entirely by the condition of the plants they inhabit. Should these stems dry through immature ripening, the larvae quickly make their way to the base of the stems and cut them, but should the stems ripen gradually or remain green for three weeks later, the larvae will postpone their preparations for winter until the stems eventually lose their sap. Thus there may be a difference of fully three weeks in the time of severing the stem, due entirely to the difference in maturity of the plants. This fact, which has already enabled farmers to save millions of bushels of wheat by cutting ahead of the sawfly, will prove still more effectual when it is taken advantage of by the whole growing community.

As now known, the various stages of the insect's life may be summarized as follows:

| | | | |
|-------------|----------|--------------------|-----------|
| Egg stage | 8 days | oviposition period | 33 days. |
| Larval life | 333 days | larval period | 345 days. |
| Pupal stage | 16 days | pupal period | 22 days. |
| Adult life | 16 days | adult period | 32 days. |

It seems hardly necessary to add that these figures are approximate, there being a variation due to meteorological and other factors.

The Wheat-stem Sawfly was originally held in check by its natural enemies, and it is still held under control by these in grasses other than grains. Of these enemies, Hymenopterous parasites are by far the most important and so numerous have they been that in 1921 infested grasses were found to be approximately 60 per cent. parasitized and, in 1922, *Agropyron* and *Bromus* showed a *Cephus* destruction of 85 per cent. due to parasites. Our chief ally in thus destroying the sawfly larvae has been *Microbracon cephi*, a species collected originally by Mr. C. N. Ainslie of the U. S. Bureau of Entomology. Other parasites have been reared, but as yet they have not been of very great service.

While the above mentioned parasites effectively control the sawfly in grasses, they have, unfortunately, made little or no headway in advancing into the grain fields, be the cause what it may. One reason, however, seems to be the cultivation of the soil for crop. In the case of *Microbracon* there is cause to suspect that cutting the crop is an important factor. There are two generations of *Microbracon cephi*; adults from the first generation appear in late June while those of the second generation do so in early August. The last date is about harvest time, and it is soon after this period that the parasites commence their egg laying. It has been noted that the parasite runs actively up and down the stem when in search of the larval host within, and that she avoids broken or cut straws. It is possible this is why the larvae in the stubble remain unmolessted. The fact remains that there is a certain amount of parasitism in wheat during July, but no sign of it in the later generation which should be apparent from September of one year to June of the following year.

CONTROL.

Very little has been added to our previous recommendations excepting that further experiments show the absolute necessity of packing spring plowing in order to prevent the sawflies emerging. Fall plowing as soon as possible after harvest is much better, because the soil packs naturally during winter, and in ad-

dition, the moisture in the soil tends to rot the stubs, which aids in destroying the larvae.

As regards trap crops, our experiments show considerable promise. In 1922 a strip of wheat sown between the previous year's stubble and the new crop, contained, on an average, rather more than four sawfly eggs to a stem, while the field which this strip was sown to protect, averaged slightly more than one egg to a stem on the edge of the field and less towards the centre. The trap strip in this instance was sown rather late and it was not, therefore, as attractive to the sawflies as it might have been had it been sown a week earlier. This was demonstrated by the fact that the more developed stems contained far more eggs. One strip, however, is not sufficient on a large stubble field; at least three are necessary.

The season of 1922 was particularly favorable for showing the advantage of harvesting before the crop had fully ripened. As had been pointed out above, the sawfly larvae do not cut the stems until they have lost the major portion of their sap, or, in other words, until the straw begins to dry. By cutting slightly in advance of this time the grain can be harvested without loss or shrinkage. Fields frequently noted in 1922 which had been cut "on the green side" were free from loss, while adjoining fields cut too late had suffered a loss which varied from three to fifteen bushels per acre.

It is well to remember, however, that early cutting does not kill the sawfly larvae, nor is it always effective in preventing all loss, because the weakened stems may be blown down and broken by storms considerably in advance of cutting time. Rust may also kill the plants prematurely, but on the whole, the practice of early harvesting is extremely effective and it cannot, therefore, be too strongly recommended.

A NEW MOSQUITO FROM BRITISH COLUMBIA (CULICIDAE, DIPTERA)*

BY ERIC HEARLE,

Vernon, B. C.

In August, 1919, while undertaking a survey of the mosquito fauna of the Lower Fraser Valley, the writer took some small, ring-legged *Aedes* at Yale, B.C. In no other locality in the territory embraced in the survey was this species encountered; but at Yale it was the only species at all common—it was evidently adapted to the canyon conditions obtaining at this place. Only females came to hand, and an accurate determination was not possible at the time, but the specimens appeared smaller than any of the known members of the *excrucians* group to which they evidently belonged. A trip to Yale on July 19th, 1920, was rewarded with several males taken feeding on white spiræa at dusk. These were tentatively placed as small specimens of *Aedes increpitus* Dyar, but a recent more careful examination of the genitalia indicates that they lie intermediate between *Aedes mutatus* Dyar and *Aedes increpitus* Dyar, and are distinct, although coming very close to the above two. According to Dr. Dyar's keys, *Aedes mutatus* Dyar has the filament of the claspette expanded towards the base, and *Aedes increpitus* Dyar has the filament expanded beyond the middle, whereas in the present species the angular expansion of the filament is exactly at the middle. I

*—Contribution from the Entomological Branch, Dept. of Agric., Ottawa, Ont.

propose the name *Aedes hewitti* after the late Dr. C. G. Hewitt.

***Aedes hewitti* new species.**

Female. Integument brownish black. Proboscis and palpi clothed with brownish black scales. Head with yellowish white flat scales, broad at cheeks; erect, forked white scales at nape; small patch of broad, dark scales at sides; bristles bordering eyes black, forward projecting ones at vertex pale. Prothoracic lobes with yellowish white scales and pale bristles. Mesonotum clothed with small, shining, dark brown scales centrally and sub-dorsally; and large, dull, dirty white scales at the sides, the anterior margin, and the border of the ante-scutellar space; bristles dark brown. Abdomen with dark scales dorsally and each segment with a concrete basal band of creamy white scales; up to fifth segment bands somewhat expanded medianly; bands on fifth to seventh segments widened triangularly at sides; first segment clothed with a patch of creamy white scales and many white hairs; cerci black; venter clothed mostly with dull white scales, a few black ones intermixed, especially along the median line. Wings dark scaled except for a few pale scales along the costal border. Halteres entirely pale. Legs with black and white scales intermixed; evenly on outside of femora, but with white predominating on inside and black towards apex; tibiae largely black scaled except on inside; tarsi black with basal white rings on all segments except the ultimate ones of the front legs; rings concrete and fairly broad except on ultimate segments. Length: body 4 to 4.5 mm.

Male. Vestiture as in female. Genitalia: side pieces about three times as long as wide; apical lobe fairly prominent; basal lobe small, rounded, delicately rugose and somewhat sparsely but uniformly setose; claspettes fairly long and curved; minutely setose at base; the filament of the claspette curved, delicate, and fairly long; an angular lateral expansion at the middle of the filament.

Holotype: One female, labelled No. 13042a; Yale, B. C.; 8. VIII. 20.

Allotype: One male, labelled No. 13042b; Yale, B. C.; 19. VII. 20.

The above are No. 521 in the Canadian National Collection.

There are also twelve Paratypes, distributed in the Collections of Dr. H. G. Dyar and the author and in the National Collection at Ottawa.

The writer is much indebted to Dr. H. G. Dyar, as it is through his assistance and kindness that he has the privilege of naming the above species.

NOTES ON THE ODONATA OF GODBOUT, QUEBEC

BY E. M. WALKER,

Toronto, Ont.

During the season of 1918 Mr. T. B. Kurata and the writer spent the greater part of July and a few days of August at the fishing village of Godbout, Province of Quebec, on the north shore of the lower St. Lawrence nearly opposite the town of Matane. The main object of our trip was to secure a series of casts of salmon in their various stages, and such other fish as were obtainable, for the Royal Ontario Museum, but plenty of time was available for collecting and observing other groups of animals and plant life.

Such success as we met with was largely due to the interest shown in all branches of our work and the kindly advice given us by the veteran hunter and naturalist, Mr. Napoleon Comeau, who was for 50 years the guardian of the Godbout River. His book, "Life and Sport on the North Shore," should be read

by all who are interested in our northern wilds. Without the benefit of his intimate knowledge of the country and its wild life it would have been difficult to find, without much loss of time, such varied territory for collecting as is described below.

The white cottages of Godbout village are scattered along a single road, which follows the curved shore line for about a mile eastward from the mouth of the Godbout River. The village is built upon a low, sandy plateau, rising abruptly from the gravelly beach to a height of ten or twelve feet, and extending inland for several miles of somewhat uneven jack pine barrens. To the west is the mouth of the Godbout River, one of the most famous salmon streams in America, while to the east is a range of high, wooded hills, extending from far inland to the shore, which they follow for many miles. Between the plateau and the hills is a richly wooded ravine, in which flows a small, clear, cold stream, whose waters are drawn from many lakes among the adjoining hills.

Godbout lies within the Canadian Life Zone, but is not far from the edge of the Hudsonian Zone, the change to a colder climate being rapid as the Gulf is entered, owing to the influence of the Labrador current. The vegetation is typical of the northern coniferous forest. The tree growth consists mainly of jack pine, black and white spruce, balsam fir, aspen and balsam poplar and white birch, a few other trees occurring more locally, such as white cedar, tamarack, gray birch, black ash and mountain ash. Among the smaller seed-plants bunchberry (*Cornus canadensis*) is almost everywhere. The undergrowth of the pine barrens is dominated by several species of the heath family, especially Labrador tea, sheep laurel, mountain cranberry (*Vaccinium vitis-idaea*) and various blueberries; while among the commonest plants in the rich ravines are, besides the bunchberry, the wild sarsaparilla, the wood-sorrel (*Oxalis acetosella*), the northern Clintonia, the creeping snowberry, and the goldthread. Club-mosses, mosses and lichens are also very abundant here. The mountain lakes usually have a fringe of alder, bog-myrtle, or in the more boggy places, leatherleaf, against a background of black spruce, while on the sandbars we found the beach pea, wonderful patches of blue flags, and the finest clumps of hairbells I have ever seen. Sphagnum is abundant everywhere, even on the pine barrens, while ordinary weeds of European origin are noticeably scarce, even in the open places about the village. Here the short grass is thickly sprinkled with a small, white, strawberry-like flower (*Potentilla tridentata*), which proved a great attraction to butterflies, particularly the little northern fritillary *Brenthis chariclea boisduvalii*, which was very abundant here and on the barrens.

The principal localities where dragonflies were collected were as follows:

(1). Several lakes on top of the range of hills. The nearest of these, which will be called lake 1, is about a quarter of a mile long, surrounded by a dense spruce forest, the water dark and peat-stained and nearly free from the larger aquatic plants. It had very little open marsh anywhere along its shore. The second lake (lake 2), not more than about 100 yards distant from the first and connected with it by a little brook, is smaller, shallower, with clearer water. It has a wide belt of open bog along one side and at the upper end, and a considerable quantity of both standing and floating aquatic vegetation. Lake 3, also near lake 1, has clear, colourless water and a gravelly bottom. It is the smallest

of the lakes. Lake 4 is much larger than all the others put together, being apparently about seven miles long. The shore is partly rocky, but we explored very little of it.

(2). A small lake (lake 5) about two miles north of the village, behind the pine barrens. This is the headwaters of the creek which opens at the east end of the village. The shore is rocky at the near end where the creek flows from it, but at the opposite end and for a considerable distance along both sides there is a wide, open marsh. A small creek flows into the lake at the upper end, through the marsh.

(3). The creek which flows from lake 5 to the east end of the village. Its course is for the most part through dense woods, but there are a few open places near the village, and a few bare sand bars. Numerous rapids occur along its course.

(4). The outlet of lake 2, a small brook connecting lakes 1 and 2. It has a gentle current and flows partly through woods, partly through an open bog. It widens slightly at the mouth, where the current becomes imperceptible.

(5). The Godbout River, a wild, rushing stream of cold, clear water. It is a typical salmon river and is not suited to dragonfly life, except along the edges of the quieter pools, where it is inhabited by two or three species.

(6). A few small ponds and puddles on the Godbout River flats below the last fall. The river here is influenced by the tides and these pools are connected at high tide, so that the water is frequently renewed. The pools are inhabited by the nymphs of certain species of *Somatochlora*.

(7). A small, stagnant puddle at the edge of a cultivated field. It was polluted with fish-manure, but contained nymphs of *Sympetrum decisum*.

The Dragonfly Fauna.

Dragonflies were sparsely represented, as were apparently most groups of insects. The small number of species taken is due partly to the cool, northern climate, partly to the absence of certain types of environment, and partly to the shortness of our visit. The season is very late in this region, and we left on the fifth of August, so that some of the later species had not yet appeared on the wing. For instance, although we found nymphs of *Aeshna umbrosa*, we saw no adults, and of *Boyeria grafiana* we obtained only one adult, which was reared, though nymphs were common; while only a few teneral of *Sympetrum decisum* had begun to appear when we left.

Species not taken by us, which are regional and probably occur somewhere in the vicinity of Godbout, are the following:—*Agrion aquabile* (Say), *Coenagrion resolutum* (Hagen), *Enallagma cyathigerum* (Charp), *Aeshna sitchensis* Hagen, *A. juncea* L., *A. subarctica* E. Walk., *Gomphus brevis* Hagen, *Somatochlora franklini* (Selys), *Sympetrum scoticum* Don. and probably other species of *Ophiogomphus*, *Somatochlora* and *Sympetrum*. The absence of *C. resolutum* is rather surprising, as this is one of the commonest and most generally distributed of all the northern Zygoptera. The lack of any species of *Lestes* is also noteworthy, but it is possible that they emerged after we left. *L. disjunctus* Selys. is the species that is commonest in the north.

1. *Agrion maculatum* Beauv. Common along the creek joining lakes 1 and 2, July 16—Aug 1. Frequently observed also on the trail through the woods.

near the outlet of lake 1. Also seen on the creek at the outlet of lake 5 on July 21.

2. *Coenagrion interrogatum* (Selys). Found only about the marshy border of lake 2, where it was not uncommon, July 16, 24. It seemed to have disappeared on Aug. 1, when we made our last visit to this spot. A pair in copula were taken on July 24. It tends to fly over the water near the boggy shore, where reed beds occur.

3. *Enallagma calverti* Morse. Common in marshy places on all the lakes. First seen on July 12, a few on the trail near lake 1 and many on the shore of this lake, including mature specimens, teneral and individuals just emerging. On July 24 it was much scarcer at lakes 1 and 2, but was still the prevalent dragonfly at lake 4, where many pairs were seen. By August 1 it had become quite scarce.

4. *Enallagma ebrium* (Hagen). The first specimen observed was a somewhat teneral female, taken on July 19 at lake 2. On the 24th it appeared in very large numbers at lake 1 and was abundant also at lakes 2 and 3, nearly replacing *calverti*. On Aug. 1 it was already much scarcer.

5. *Ophiogomphus colubrinus* Selys. A female, somewhat teneral, was captured on July 8 in the open pine barrens, close to the ravine in which the creek flows. Following this capture we watched for some time at the creek but got only one fleeting glimpse of a green gomphine, probably this species, flying swiftly down stream.

Numerous exuvia of *Ophiogomphus*, apparently representing two species, were found on the banks of the Godbout River on July 26 and 31. They were found on the moss under overhanging foliage and had evidently been near the waterline when the insects emerged, though they were a few feet away from it when found.

6. *Gomphus exilis* Selys. This species was not seen until July 24, when it appeared at lakes 1 and 2 in fair numbers. They flew over the bushes at the water's edge, resting on branches and on the ground in sunny places along the portage between the two lakes. On July 28, while collecting at the creek, a small gomphine resembling this species was seen to settle now and then on a gravelly part of the shore, but it was so wary and flew so swiftly that we failed to capture it.

7. *Cordulegaster maculatus* Selys. Very common, flying along the course of the small brook, connecting lakes 1 and 2, and also frequently seen patrolling the creek. The first specimen was taken on July 13 at the edge of a patch of woods a few rods from the creek. When patrolling the stream they fly very close to the water, except when they rise to clear logs or other obstructions.

8. *Cordulegaster diastatops* (Selys.). This species occurred with the preceding at the brook between lakes 1 and 1, but was not seen elsewhere. It flew up and down stream in the same manner as that species, or was sometimes seen alternately hovering over the water or moving onwards in a jerky fashion. Occasionally it was observed in open places nearby, where it would sometimes rest upon a bush or branch. It was common on July 16 and 24, while only a single specimen was taken on August 1. All the specimens taken were males.

9. *Boyeria grafiana* Wmsn. Two full-grown nymphs of this species were brought to us from the Godbout River on July 13, one of them transforming to an adult on the 26th. On the latter date we found several nymphs at the edge of the river, some of them under stones at the water line. All were apparently ready to transform, though one had died. No adults were seen at large at any time.

10. *Aeshna eremita* Scudd. This large dragonfly was first noticed on July 19 at lake 2 and was in full colour at that time. Several were seen coursing over the lake or patrolling its margins irregularly. It was frequently seen thereafter but was soon outnumbered by *A. interrupta*. On the 25th both species appeared in numbers around a waterfall near Point des Monts, about seven miles east of Godbout. On the following day we found them in large numbers flying over the Godbout River flats. They were hawking after a species of Crambid moth which was exceedingly abundant in the grass. Swarms of Aeshnas were observed here also on the 29th and 31st of July, but of a large number captured only a few individuals taken on the 29th were *eremita*. Exuvia were frequently found on the marshy borders of lake 2 and on the open bog on lake 5. While collecting at the latter locality on August 3 a male of this species was hawking over the swamp and was evidently attracted by the blackflies that were circling around my head. This habit is common with Aeshnas and some other dragonflies.

11. *Aeshna interrupta* E. Walk. Not seen until July 21, when a young female was taken at the outlet of lake 5. After this date it speedily became abundant, soon outnumbering *A. eremita*. It was common near Point des Monts on July 25, associated with *eremita* (q. v.), and appeared in large numbers on the Godbout River flats on the 26th, 29th and 30th. While watching for Somatochloras at the pools on the flats *A. interrupta* would occasionally visit the pools but never for more than a few minutes. They did not appear to breed here, in fact we did not find their exuvia anywhere. Like the preceding, this species was sometimes attracted by the blackflies around us. On Aug. 4 Aeshnas were flying not only over the flats but also farther up the river, where the valley is narrow and heavily wooded. Many were even flying over the rapids.

12. *Aeshna umbrosa* E. Walk. One or two young nymphs of this species were found in the creek, but no adults appeared. Its season for transformation perhaps had not begun when we left, though in Ontario the first individuals regularly appear before those of *Boyeria grafiana*.

13. *Cordulia shurtleffi* Scudd. Very common at all the lakes, although few females were seen at any time. Its season was in full swing when we made our first trip to lake 1 on July 12. Males were skirting the edge of the lake in some numbers. They flew within reach of the net from shore and about a foot or less above the water. They were still fairly common on Aug. 1, when we made our last trip to the mountain lakes, but none were noticed at lake 5 on Aug. 3, though they had been abundant here, to judge by the number of exuvia present. One was observed with *Somatochlora albicincta* at one of the ponds on the Godbout River flats. Its movements were similar to those of this species, except that it kept within a few inches of the water. Exuvia were very common on the marshy borders of lakes 2 and 5.

14. *Somatochlora minor* (Calvert). First observed on July 16 at the brook connecting lakes 1 and 2. The first specimen taken was a male, which was flying in one of the more open spots in the sunlight. Afterwards many other males were seen flying over the stream, sometimes following the course, sometimes hovering over the water at the height of one or two feet, or flying in small openings nearby, patrolling the space in the usual way, 4 to 8 feet from the ground. It was not found at the outlet, being distinctly a species of the small, quietly running streams. It was also taken on subsequent visits to this locality and on Aug. 1 a male was captured at the creek which flows through the open bog at the opposite end of lake 2. All the specimens seen were males.

15. *Somatochlora albicincta* (Burm.). The first specimen was taken on the morning of July 16. It was a male and was hovering over the quiet water at the mouth of the brook between lakes 1 and 2, and moving up stream a few yards and then back again to the mouth, keeping within a foot or so of the water. Another appeared at the opposite end of the creek, where the current is likewise imperceptible, and a third was taken on July 18 while skirting the boggy edge of lake 2, near the outlet. Near the upper end of the same lake are several small, clear, sluggish streams and on each of these one or two specimens of *S. albicincta* were flying on Aug. 1. About a dozen specimens were also captured while flying back and forth over the small ponds and puddles on the Godbout River flats, which were filled but not wholly flooded at each tide. Most of these were taken on July 29 and were all males except one female, which was ovipositing. These insects seemed to prefer one of the largest ponds, which was about 20 feet long and 10 feet wide and almost free from vegetation except a few small reeds, but not more than two or three individuals appeared there at a time. The males moved along rather slowly with rapidly vibrating wings, but when two came in contact or approached one another, they would often dash off together with great speed, leaving the pond for a few minutes, after which one of them would return, apparently having succeeded in driving the other away. As a rule they keep about a foot above the water or marsh. When flying around the pond they would often also follow the small outlet for a short distance and sometimes they would fly back and forth over a small wet marsh, with numerous puddles, near the pond, examining the latter also on their way. The female was seen but a few seconds, tapping the water with the end of her abdomen and moving along as she did so.

Two nymphs were taken from the small puddles along with several of *S. forcipata*, on July 29, and from one of these a perfect male emerged at Toronto on June 1 of the following year. An exuvium was found on the shore of lake 5 on Aug. 3.

16. *Somatochlora cingulata* (Selys). First observed on July 16, this large species was frequently seen and taken throughout our visit to this region. In contrast to the other species of the genus it frequents lakes rather than streams or ponds, and often roams a considerable distance afield. The first specimens seen were flying at a height of 10 to 20 feet about the lower end and the outlet of lake 2 and in openings in the woods nearby. They seldom came within reach of the net and only two specimens, male and female, were taken. They seemed

sensitive to light and disappeared as soon as the sky became overcast. On July 19 there was but a brief period of sunshine, and only one or two *cingulata* were seen in this locality, both flying at a height of 40 to 50 feet and soon disappearing. On the 21st we visited lake 5, the headwaters of the creek, and here we found *cingulata* in numbers. This lake is almost surrounded by bog, but in the vicinity of the outlet the shore is rocky for a short distance, and the stream bed, as it leaves the lake, is also rocky. It was about the outlet and the adjacent rocky shore that *cingulata* was chiefly found, and it was only here that we saw the female ovipositing and found the exuvia. Males were flying here and there over the water, following a rather irregular course, sometimes following the shore a little way, but sometimes deviating and flying out over the water. The flight resembled that of *Macromia* or *Epicordulia* and was not jerky like that of *S. minor* or *C. shurtleffi*, i. e., there was no hovering over one spot. It was usually quite low, within two or three feet of the water, but sometimes they would dash upwards, particularly when two came together. They were not easy to capture, but by remaining in certain favourable spots we finally managed to net 17 specimens, all males. Several attempts at copulation were witnessed, but the pair usually dropped into the water and separated. Several times females were seen ovipositing after the manner of *S. albicincta*. This always took place near the outlet, where there was some current, but not actually in the stream. Careful search among the bushes along the shore near the outlet revealed a number of exuvia, together with a much larger number of *C. shurtleffi*. They were a few feet from the water's edge, but this had evidently receded considerably since the insects had emerged. In a few cases the exuvia of *S. cingulata* were hung up on bushes but the majority were lying upon the ground. On this occasion the sun was overcast much of the time, though there were many periods of bright sunshine, but the dragonflies showed little tendency to discontinue their flight and were almost continuously active.

On subsequent occasions this species was frequently taken, often flying about the edges of the woods or over the open barrens at a considerable distance from its breeding places. It was seen on all the lakes and was one of the dominant species on lake 4, the largest of the series. A female was also taken on the shore of the St. Lawrence, near Point des Monts, on July 5.

17. *Somatochlora kennedyi* E. Walk. This species was seen only on July 29, when it appeared with *S. albicincta*, flying over the two larger ponds on the Godbout flats. Two females were seen, one of which was captured after several failures; and a female was taken by Mr. Kurata while ovipositing in one of the ponds.

18. *Somatochlora forcipata* Scudd. Mr. Kurata discovered the dark-coloured nymphs of this species in the small puddles in the Godbout River flats. Several were found on the 26th, and another, together with an exuvium, on the 29th. The nymphs, which were all full-grown, were kept alive and fed during our stay at Godbout, but only three were carried through the winter. One of these died in the spring, while from the others two females emerged on May 29, 1919.

This was apparently the commonest nymph in these puddles, and yet no adults were seen here, the only species of the genus observed flying over the

puddles being *S. albicincta*, of which two nymphs were found, and *S. kennedyi*, the nymph of which is still unknown.

19. *Libellula quadrimaculata* L. On July 21 this species was flying in some abundance over the large marsh at the head of lake 5. A small creek flows through the marsh into the lake, and it was chiefly about this creek and over the adjoining lake margin that the Libellulae were flying. They were also seen here on Aug. 3, but the weather being cool and windy, they were all at rest among the rushes until flushed, when they flew with almost their usual speed. A single individual was also seen on July 24 at lake 2.

20. *Libellula exusta julia* (Uhler). Apparently rare or local in this locality, as only one specimen was taken. This was a female and was captured on July 16 at the mouth of the creek connecting lakes 1 and 2.

21. *Sympetrum decisum* (Hagen). A full-grown nymph of this species was found on July 11 in a ditch on the edge of a somewhat marshy clearing near the village. The water was very dark and was polluted with fish-manure. A few teneral adults were also taken near the village on July 25.

This species is one of the forms commonly known as *S. rubicundulum*, but, in the writer's opinion, is distinct from the form most commonly quoted under this name in the eastern United States, while it is undoubtedly conspecific with the western form *decisum*, as recognized by Ris (Cat. Coll. Selys, XIII, 684, 1911).

22. *Leucorrhinia hudsonica* (Selys). First observed on July 16 at lake 2. It was common on the open bog all around the lake, both tenerals and fully mature individuals being present. The majority were mature males, while all the tenerals examined were females. A few copulating pairs were seen. This species was also taken here on July 19 and 24 and on Aug. 1, but had become scarce on the last date. They were also taken in small numbers at lake 5 on July 21 and Aug. 3. A female was observed on July 24 ovipositing close to a boggy part of the shore of lake 1. Exuvia were found at lake 2 on July 19 and at lake 5 on July 21.

23. *Leucorrhinia proxima* Calvert. The most abundant *Leucorrhinia* of Godbout. It was found with the preceding species wherever the latter was observed and, except on July 16, it was always the commoner species. On this date it was first seen on the large bog at the head of lake 2, where it was common. It was in full colour and two copulating pairs were taken. On the 19th it was abundant everywhere on this lake, though few of either this species or *hudsonica* were visible so long as the sun was overcast. When the weather cleared, however, they seemed to appear in an instant. Like *hudsonica* they became scarcer about the beginning of August. On Aug. 3 a few were flying about lake 5, but the weather was cool and windy and they were very sluggish. In addition to the localities mentioned *L. proxima* was not uncommon on July 29 and 30 about the small puddles on the Godbout River flats, where the *Somatochlora*s occurred. Exuvia were found at both lakes 2 and 5, where the adults were most common.

24. *Leucorrhinia glacialis* Hagen. Rare at Godbout, only three males having been taken. One of these was captured on July 20 in an open wood near the pine barrens, the nearest lake (lake 5) being a mile away. The other two were taken at lake 2 on July 24 and lake 1 on Aug. 1.

ON THE SYNONYMY OF THE PEA MOTH

BY CARL HEINRICH,

Bureau of Entomology, U. S. Dept. of Agriculture.

In the Canadian Entomologist for November 1920 (pp. 257—258) I stated that our American pea moth, which had been known for many years as *Laspeyresia nigricana* Stephens was different from the European species of that name and proposed for it the name *novimundi*. In this I was in error, and I regret exceedingly that I was led into making an entirely unnecessary synonym for a well known economic species. The American and European pea moths are identical and the name *novimundi* Heinrich must fall as a synonym of *nigricana* Stephens. I find upon revising the Laspeyresiinae that our series of European specimens of *nigricana* in the National Museum are mixed and represent two distinct but very close species: *nebritana* Treitschke and *nigricana* Stephens (*nebritana* Zeller, not Treitschke) both under the name *nebritana* Treitschke. Unfortunately the specimen I selected for genital study and the harpe of which I figured (fig. 25 p. 258, Can. Ent., 1920) was one of the true *nebritana*. Genitalia of other males from the series agree with those I figured for *novimundi*. The two species (*nebritana* Treitschke and *nigricana* Stephens) have been kept separate in European lists but have been more or less confused. In fact Spuler intimates that they may be synonymous. Both are pea moths. Their genitalia however show them to be quite distinct.

The figures given in my previous article (and which by the way are printed upside down) represent: fig. 24, *Laspeyresia nigricana* Stephens (*novimundi* Heinrich) and fig. 25, *L. nebritana* Treitschke (*nigricana* Heinrich, not Stephens.)

NOTES ON THE COLEOPTERA OF SOUTHERN FLORIDA WITH DESCRIPTIONS OF NEW SPECIES

BY W. S. BLATCHLEY,

Indianapolis, Ind.

My last season's collecting in Florida began on November 18th, 1921, the day after I reached my winter home at Dunedin, and continued until April 14th, 1922, the day before I started on my spring migration northward. There was, however, an interim between December 20th and February 15th, when but little collecting was done, as the coleoptera were then mainly dormant and hibernating beneath the most available cover.

On March 19th I started on a twelve days' collecting trip to the Lake Okechobee region, making my headquarters at first at Moore Haven, a town of about fifteen hundred population located on the former southwestern shore of the lake, but now twelve miles inland and connected with it by a dredged canal along the former outlet and source of the Caloosahatchie River. The region for miles around Moore Haven is a flat muck prairie, the former bed of the lake, almost devoid of shrubs and trees, so that no beating could be done. By sweeping herbage and using a water net in the canal and some tributary ditches, I succeeded in securing a good number of species, mostly aquatic or semiaquatic in habit. On March 23, I left with a friend on a small freight boat which he was running between Moore Haven and various points around the southern half of the lake. We were gone four days, living on the boat, and I was able to collect, sometimes several hours at a time, while he was discharging and taking on freight.

When I first saw Lake Okeechobee in 1911, and again in 1913, its shores were practically uninhabited and almost unmarred by man. Land about the lake could then be bought for \$5.00 or less per acre. Close to the water it was covered with shrubs and vines growing so densely that there was scarcely a place where I could use a sweep-net to advantage.¹ Now there are four towns of three hundred to one thousand inhabitants each, around this portion of the lake, and the shores, where not too marshy, are one almost continuous settlement. Little if any of the land can now be purchased for less than \$300 per acre. The vegetation has been so cleared away that only at two stopping points was I able to do any beating, but had to collect by sweeping in truck patches and along roadsides, or by searching beneath debris along the lake beaches. For that reason I got few species that I had not taken before, but quite a number which were desirable as additions or duplicates.

Returning to Moore Haven on the evening of March 26th, I left the next morning for Palmdale, a station near Fish-eating Creek, where I was able to do some fairly remunerative beating for a half day; then taking the evening train north some forty miles, I stopped at Istokpoga, a station only, near the west shore of the large lake of that name. I had been here for several days in the spring of 1913, and found conditions but little changed. A partially drained cypress swamp with numerous shrubs growing about its margins and some near-by meadows furnished both excellent beating and sweeping grounds, and I had here the most successful and pleasant two days' collecting of the trip. At Lake Wales, in one of the most beautiful citrus-growing regions of South Florida, I was able to stop a day, but rain prevented work in the afternoon, coming on just after I had taken my first and only specimen of the new *Leptotrachelus* described below. Leaving there by flyver at 3 p.m., a drive of ninety or more miles to the northwest, via Lakeland and Tampa, put me in to Dunedin at about 8 o'clock in the evening of March 31st.

In the pages which follow I have included notes on the distribution or habits of a number of Floridian species sent me by other collectors or taken by me in previous years, in order that our knowledge of the beetle fauna of the State may gradually be made more definite as to local distribution. Many of the older Coleopterists, including both Leconte and Horré, were content to put "Fla." or "Florida" after their descriptions, forgetting that the State is approximately 400 miles long, 360 miles wide across its northern border, and contains an area of nearly 60,000 square miles. Representatives of three distinct faunas, the Austroriparian, Subtropical and Tropical, live within its bounds, and the time has come when more definite and accurate distribution notes, than those furnished by the mere name of the State, are in demand.

*Cicindela dorsalis saulcyi*² Guer.—This handsome form, which has the elytra wholly white, was found April 11th, in small numbers, on the Gulf beach at the south end of Hog Island opposite Dunedin. I had not before taken it in the State, though Leng records it from several localities along the west coast, and states³

1—See Can. Ent. XLVI, 1914, 62.

2—In the notes and descriptions which follow, the nomenclature and sequence is that of Leng's Catalogue of the Coleoptera of America North of Mexico. The Rhynchophora taken will be treated elsewhere.

3—Bull. Amer. Mus. Nat. Hist, XXIV, 1915, 561.

that: "It appears to be confined to the shore of the Gulf of Mexico, extending westward to Texas."

Dyschirius filiformis Lec.—One specimen of this slender bodied little Carabid was taken February 26th from beneath a board on the margin of a brackish water pond. Its length is but 2.7 mm., though stated in the original description to be .14 inch (3.5 mm.). Recorded by Schwarz as rare at Ft. Capron and Haulover on the east coast, and by Leng from Punta Gorda.

***Clivina dissimilis* sp. nov.**

Elongate, convex, relatively robust. Head, thorax and under surface dark chestnut-brown; elytra reddish-brown, shining, with a broad vague angulate fuscous shading at base and another at middle; antennae dark brown; fore femora chestnut-brown, the legs otherwise reddish-brown. Head impunctate, front with a short, distinct median groove, each side of which is a minute carina; clypeus entire, rounded at sides. Thorax strongly pedunculate, its disk subquadrate, slightly longer than wide, smooth, the median impressed line entire; hind angles rounded, not dentate; lateral marginal line not reaching the base but bent inward and forming a pseudo-basal margin midway between the true base and the plane of the upper surface. Elytra conjointly a little narrower than thorax, disk striate and punctate on basal half, both striae and punctures becoming faint or obsolete towards apex, third stria with two dorsal punctures. Middle tibiae without subapical spur. Intermediate anal setae-bearing punctures approximate. Length 4.7 mm.

Described from a single example taken at Dunedin, December 1st, from beneath a board in the damp sand of the bay beach. Evidently a subaritime species belonging to the *bipustulata* group of Fall.⁴ Resembles superficially in color and size *rubricunda* Lec., but easily distinguished by the longer thorax, with unarmed hind angles and pseudo-basal margin.

***Leptotrachelus depressus* sp. nov.**

Elongate, slender, depressed. Pale dull yellow throughout except the elytra, on which there is a narrow sutural piceous stripe beginning about basal fourth and of nearly equal width to apical fourth whence it gradually widens to apex. Head smaller and less convex than in *dorsalis*, behind the eyes distinctly shorter with sides more rounded than there. Antennae with joints 5—11 pale brown, all except the basal one pubescent. Thorax subfusiform, widest at middle, the sides very broadly curved, feebly sinuate near base; disk with a fine median impressed line, smooth except in a vague curved impression each side of basal third, where there are a few shallow punctures; margins with a single median bristle-bearing puncture. Elytra elongate-oval, strongly depressed, very feebly striate, the striae with fine, very slightly impressed punctures, these obsolete near tip; intervals flat, the second with two setae-bearing punctures. Length 6 mm.

Lake Wales, Fla., March 31st; a single male taken from between the leaves and stems of a tall saw-grass growing in shallow water along the margin of a lake. Others might have been found but a heavy shower prevented. Very different from *dorsalis* in color, shape of head and thorax, and in the strongly depressed feebly striate elytra. The disk of elytra, viewed from above, appears to be feebly concave in the common area between the fifth stria of each side.

Thalpius pygmaeus Dej.—One specimen was taken from beneath debris near the water of Lake Okeechobee at both Pahoka and Canal Point and a third at Moore Haven. From the State it has been heretofore recorded only from single specimens taken at Ft. Capron and Enterprise.

Anatrichis minuta (Dej.).—This species, usually regarded as scarce, was taken in numbers from beneath debris at all points visited on Lake Okeechobee, and also along the canal at Moore Haven. It occurs just above high water line in dry, sandy spots. Next to *Oodes duodecimstriatus* Chev. it was the most common Carabid found about the lake.

Stenolophus conjunctus (Say).—This widely distributed little Carabid appears to vary much in hue. Several specimens having the upper surface wholly shining black, but not apparently otherwise differing from the common form, were taken in April from beneath debris on the bay beach at Dunedin.

Agonoderus pallipes (Fabr.).—Two specimens of this common northern form were taken at Moore Haven from beneath shore-line debris. Not before known from Florida, though its near relative, *A. infuscatus* Dej., is common in the State.

Omophron labiatum (Fabr.).—This, the only member of the genus known from Florida, is distributed throughout the State. I mention it here only to record its abundance along the canal at Moore Haven, where it was found by scores buried in the narrow margin of damp sand along the edge of the water. By scraping aside with a trowel a half inch or more of the sand over a small area, the backs of a half a dozen or so of the beetles would be exposed. If not too much disturbed by the scraping they would remain quiescent, but when touched would hurry away to the nearest shelter or attempt to burrow deeply into the protecting sand.

Pachydus princeps (Blatch.).—The third known specimen was taken February 22nd from amongst some decaying water weeds in the edge of Jerry Lake, three miles east of Dunedin. The type was from Lake Okeechobee near Pahoka and the second specimen from Ft. Myers.

Matus bicarinatus (Say).—A single specimen was taken from beneath beach debris at Pahoka. It is the third I have from the State, where it appears to be very scarce.

Cercyon variegatum Sharp.—This small Hydrophilid was taken in numbers at Palmdale and Istokopoga, March 28—30, from beneath cow dung in low, moist woods. Others are at hand from Dunedin, taken from beneath the same substance in February and March.

***Cercyon testaceum* sp. nov.**

Oblong-oval, subconvex. Color in great part reddish-brown, shining; the elytra each with an area beginning on margin at basal third and widening gradually and obliquely backward to meet and cover apical fourth, pale brownish-yellow; antennae reddish-brown, the club piceous. Head broader between the eyes than long, finely and closely punctate. Thorax twice as broad as long, sides broadly curved from base to apex, the margin reaching hind angle only, disk finely, evenly and densely punctate. Elytra finely striate, the striae minutely and closely punctate; intervals slightly convex, the eighth and tenth very narrow and unseriately punctate, the others wider, minutely closely punctate. Under sur-

face and legs smooth, concolorous, the meso- and metasternal areas finely and sparsely punctate, the former narrowly elliptical, the latter subhexagonal, without lateral prolongations. Length 2.5—2.8 mm.

Sarasota, Ft. Myers and Pahoka, Fla., February 14—March 25. One specimen taken at each place from decaying vegetation on the edges of fresh water ponds or lakes. The Sarasota specimen and type is the one formerly recorded by me⁵ as *C. variegatum* Sharp, but the taking since of two additional examples and of numerous specimens of *variegatum* show the latter to be shorter and more broadly oval, distinctly more convex, more sparsely punctate and with head and thorax wholly or in part piceous. The colors of the elytra in *testaceum* are in arrangement and extent like those of the common *C. praetextatum* (Say), the reddish-brown corresponding to the black and the paler yellow to the yellow of that form. In *praetextatum*, however, the eighth and tenth intervals are not narrowed and have two or more rows of punctures. This is the only wholly pale species of *Cercyon* known from the eastern United States, and belongs under the No. 11 of Horn's key.⁶

Ptinidium ulkei Matth.—A form which agrees in all essential characters with the description of this minute species occurs frequently beneath cover on the bay beach at Dunedin throughout the winter. Schwarz records⁷ a *Ptenidium atomaroides* Mots. as "Common in salt marsh on the eastern coast" of Florida. Leng, in his Catalogue, includes this with a question mark. From some source I have a note that the species so listed by Schwarz is *ulkei*, which was described from the District of Columbia.

Xestipyge (Paromalus) conjunctum (Say).—A specimen of this small Histerid was taken at Dunedin, February 26th, from a pile of decaying unhulled rice, and another, March 14th, from beneath the skeleton of a horse. Definitely known from the State only from Fernandina.

Saprinus sphaeroides Lec.—A specimen of this very shining bronzed species was taken at Dunedin from beneath cover along the bay front in February, and others are at hand from Little River. They are smaller than those taken in Indiana along the beach of Lake Michigan, but show no structural differences. Recorded from Florida only from Enterprise.

Hydnocera pallipennis Say.—A single specimen was taken at Dunedin, April 8th, while sweeping ferns in Skinner's Hammock. Not before recorded from Florida, though known from Canada to Alabama.

Isohydnocera (Hydnocera) aegra (Newn).—A rather common species about Dunedin, where it occurs in winter and spring on the tall dead grasses about the margins of ponds. Taken also at Lake Wales.

Tetraonyx quadrimaculata (Fab.).—One specimen taken at Gainesville and sent me by Prof. Watson. Known hitherto in the State only from Crescent City, where Schwarz (Ms.) found it "rare and feeding on *Centrosema virginianum* Benth., a wild large flowering pea."

Nemognatha punctulata Lec.—Also taken at Gainesville by Prof. Watson. The types of Leconte were from Georgia and it has not since been recorded from elsewhere.

5—Bull. Amer. Mus. Nat. Hist., XLI, 1919, 322.

6—Trans. Amer. Ent. Soc., XVII, 1890, 290.

7—Proc. Amer. Phil. Soc., XVII, 1878, 439.

Mecynotarsus elegans Lec.—This handsome little Anthicid was not known from the west coast until discovered by Mr. Fall, who took a half dozen or so, April 3rd, on the bay beach just south of my residence at Dunedin. After his departure I found them quite plentiful beneath weeds and boards on the dry sand above high water mark. When uncovered they remain quiet for some time, and being so small, with hues blending perfectly with that of the sand, they are invisible. It is only by lying flat on the sand and watching for motion that they can be seen. Once started they run very rapidly towards the nearest cover. Schwarz records it as "common on the ocean beach (of the east coast) in May and June."

Anthicus (Acanthinus) trifasciatus Fabr.—Several specimens of this coarsely sculptured West Indian species were obtained about Dunedin during the winter. They were taken while beating a pile of the dead leaves of cabbage palmetto, and from beneath cover along the bay front. Known from the State heretofore only from Cape Sable and Key West.

Sericus silaceus (Say).—A single individual was swept, March 27th, from the foliage of the moonvine near Moore Haven. Known heretofore in the State only from St. Augustine and Haulover on the east coast.

Agrilus lateralis (Say).—While beating bunches of Spanish moss in a partially drained cypress swamp at Istokpoga I secured about a dozen examples of this large and handsome Agrilid. The only record for the State is that of Frost⁸ from St. Augustine, April 21st, 1919. Its known range extends from Maine to New Mexico.

Brachys aeruginosa Gory.—My first Floridian specimen of this little Buprestid was also obtained with the *Agrilus* above mentioned. It has been taken in the State only at Jacksonville.

Ora troberti (Guer.)—Two examples of this prettily colored species were recently received from Chokoloskee. It is a Mexican form, recorded from Texas and taken by Schwarz (Ms.) at Crescent City, Fla., though his specimens may be the *O. texana* Champ. which Horn erroneously referred⁹ to *troberti*. *O. texana* occurs sparingly about Dunedin on marsh golden-rod and at porch light.

Scirtes orbiculatus (Fabr.)—I can find no record of this well marked form from Florida. Specimens are at hand from Dunedin, Lakeland, Istokpoga and Palmdale. It occurs on foliage in the close vicinity of water.

Cryptorhopalum ruficorne Lec.—This species is at hand from Ormond, Gainesville, Dunedin, Lake Wales and Palmdale, Fla. Schwarz recorded it as rare at New Smyrna and Enterprise. It is taken in spring by sweeping huckleberry and other low shrubs.

Cryptorhopalum picicorne Lec.—This is a frequent Dermestid in Florida, having been taken by me at seven different stations, but it does not appear in any of the lists nor in the Leng Catalogue from there. It occurs throughout the winter either beneath cover or on the flowers of various plants.

Tenebroides corticalis (Melsh.)—Evidently a scarce species in Florida, as it is recorded only from Lake Worth¹⁰ by Hamilton. My first and only speci-

8—Can. Ent. 1920, 249.

9—Trans. Amer. Ent. Soc., VII, I 102.

10—Can. Ent., XXVI, 1894, 252.

men from the State was taken at Dunedin, March 14th, by beating a bunch of Spanish moss.

Tomarus pulchellus Lec.—A common northern form hitherto known in Florida only from St. Augustine. A specimen was taken at Moore Haven, March 29th, and another at Dunedin, April 8; the former by sweeping, the latter beneath weeds on the sand of the bay front. Its congener, *T. hirtellus* Sz., is frequent beneath dead leaves at Dunedin throughout the winter.

Synchita dentata Horn.—The unique type, described from Tampa, Fla., appears to be the only specimen so far recorded.¹¹ A single individual was taken March 14th at Everglade while beating. It differs from *S. granulata*, which is frequent in Florida, in being smaller, darker, with head and thorax much more coarsely granulate. My specimen has the sides of thorax 10-dentate, not 8-dentate as stated by Horn.

Euffalia seminivens (Mots.)—This minute and prettily marked Lathridid, formerly known as *Belonia unicostata* (Bel.), was taken in numbers in February and April from beneath an empty fertilizer sack lying in a barnyard near Dunedin. It is known from Cuba and Mexico, and has been recorded from Crescent City, Fla., by Fall.¹² They crawl very slowly when exposed to the light, and being only 1.3 mm. in length, are almost invisible. The color is rufo-testaceous, the head and thorax, in fresh specimens, covered with a white, wax-like secretion, whence the specific name.

Scymnus oculatus Blatch.—The second known specimen of this minute Coccinellid was taken March 24th while beating custard apple etc., near the lock of the Hillsboro Canal a mile east of Lake Okeechobee. It differs from the type only in having the common pale central spot of elytra much larger, covering the greater part of the disk but surrounded on all sides by a black margin. The unique type¹³ was from Dunedin.

Leichenium variegatum Kust.—The first Florida specimen of this handsome little Tenebriod was discovered April 4th by Fall on the bay beach at Dunedin, and I afterward found three additional examples. They occurred with *Mecynotarsus elegans* beneath creeping weeds on the dry sand above high water mark, and remained motionless when uncovered. It was described from Madagascar and has been taken in this country only at Mobile, Alabama, by Loding.

Cis lodingi Dury.—A single example is at hand from Ormond, Fla., April 15th. Dury's types were from Mobile, Alabama, and it has not been recorded elsewhere.

Cis impressa Casey.—One male was taken at porch light at Dunedin, June 10 and identified for me by Dury. The first record for the State.

Orthocis pulcher Kraus.—Two specimens were obtained at Lakeland, February 16th, by beating dead branches of oak. Described¹⁴ from Key West and not hitherto known elsewhere.

Euphoria limbalis Fall.¹⁵—This is the species listed by Schwarz¹⁶ as *E. fulgida* var. It was taken by him at Enterprise, Biscayne Bay and Buck Key.

11—Trans. Amer. Ent. Soc., XII, 1885, 139.

12—Trans. Amer. Ent. Soc., XXVI, 1899, 143.

13—Can. Ent., XLIX, 1917, 140.

14—Proc. Ent. Soc. Wash., X, 1908, 78.

15—Can. Ent., XXXVII, 1905, 273.

16—Proc. Amer. Phil. Soc., XVII, 1878, 451.

I recently received a specimen from Chokoloskee. It probably replaces *fulgida* throughout the State.

Cryptocephalus albicans Hald.—Schaeffer (Ms.) regards this as a valid species, and reports a specimen in his collection from Gulfport, Fla. I have recently received one for naming from W. T. Davis, taken May 5th at Lakeland. Neither *albicans* nor *gibbicollis* Hald., of which Leng places *albicans* a synonym, have been hitherto recorded definitely from Florida.

(to be continued.)

A NEW GENUS AND SPECIES OF XYELIDAE (TENTHREDINOIDEA, HYMENOPTERA) FROM WESTERN CANADA.*

BY C. HOWARD CURRAN,
Ottawa, Canada.

Neoxyela new genus

Possesses all the characteristics of *Xyela* Dalman, but there are only two marginal cells (free part of R₂ wanting) and the ovipositor is almost as long as the head, thorax and abdomen combined, and is curved downwards. Genotype *N. alberta*.

Neoxyela alberta new species

♀. Length 3 mm.; ovipositor 2.75 mm. Antennal furrows obsolete above, front broadly depressed on the middle line between the antennal furrows; anterior ocellus sunken, the posterior ones bordered behind with deep depressions which extend interiorly to join the depression around the anterior one; a faint depression extending from the outside of the lateral ocelli to the vertex. Front finely scrobiculate, the swollen vertical area finely transversely rugose; the depressions and sides more polished. A well marked transverse depression between the antennae; between which and the clypeal suture it is gently swollen; labrum short, broad, evenly rounded; clypeus carinate in the middle, its apex gently rounded; only a little broadly prominent in the middle. Face whitish yellowish, the supra-clypeal carina and the sutures piceous blackish; front piceous blackish, a moderately broad occipital stripe, curving towards the vertex above, whitish yellow. Antennae piceous, the third segment not quite as long as the following segments combined; the fourth slightly longer than the fifth, the apical segment a little swollen.

Thorax piceous black, the tegulae, postcalar calli and pectus whitish yellow. Scutellum not with a median longitudinal depression.

Legs with the coxae and femora piceous black, the bases of the femora, apices of the coxae and the remainder of the legs piceous yellowish.

Wings dilutely yellowish, the stigma over twice as long as broad, second marginal cell nearly three times as long as the first.

Abdomen piceous, the venter with a yellowish tinge, ovipositor curved downwards, its basal four-fifths piceous yellowish, the apex black.

Holotype. ♀, Banff, Alberta, May 27, 1922, (C. B. D. Garrett); No. 520, in the Canadian National Collection, Ottawa.

Paratype. ♀, Banff, Alberta, June 5, 1922, (Garrett).

*—Contribution from the Division of Systematic Entomology, Entomological Branch, Department of Agriculture, Ottawa.

NOTES AND DESCRIPTIONS OF SOME FOSSORIAL HYMENOPTERA.

BY NATHAN BANKS,
Cambridge, Mass.

Below are a few descriptions and notes on Philanthidae and Scoliidae.

Philanthus consimilis n. n.

P. assimilis Bks., Can. Ent. 1919, 404 (not Bull. Amer. Mus. Nat. Hist. XXXII, 422, 1913.)

Cerceris salome n. sp.

♀. Black, marked with yellow; spot on base of mandibles, above base of mandibles, each side on face, above and below clypeal process, median carina, flagellum below, dot behind eyes, small spots on pronotum, postscutellum, two spots on first abdominal segment, broad band, emarginate in middle, on the second, narrow marginal bands on other segments above, broader on last, yellow. Legs yellow, tarsi darker, and femora black except hind femora at tips, hind tibiae with inner apical dark spot. Body rather evenly and coarsely punctate. Clypeal process about twice as broad as long, margin slightly concave; enclosure strongly longitudinally striate; stigma blackish; pygidium twice as long as broad, sides parallel. Length 13 mm. From Long Island, and Nyack, N. Y.; Wellesley, Mass. (Morse); and Jones' Creek, Lee Co., Va.

In my table (1912) it runs to 25, where it will not agree with either alternative; differing in the yellow marks, the band on second segment broader than others, the clypeal process concave in front, and the enclosure striate. It resembles *C. halone* in general, but the enclosure is different, and the clypeal process longer.

Cerceris sayi n. sp.

♀. Black, marked with pale yellow as follows: Base of mandibles, double spot on the clypeal process, long spot each side on face, spot behind eyes, two on pronotum, the postscutellum, two large spots on propodeum, two large spots on the first abdominal segment, and subequal broad bands on each of the following segments, broadly emarginate in front; venter black, unmarked; legs reddish to yellow in part; antennae reddish on basal part; wings rather smoky, darker towards the costal tip, stigma reddish; moderately coarsely and densely punctate, clothed with white hair, that on head, pronotum, propodeum and basal abdominal segment very long; tawny hair on each side of the pygidial area, and a tuft each side at tip. Clypeal process large, suberect, one and a half times as broad as long, hardly narrowed at tip, deeply, angularly emarginate in front. Enclosure evenly, rather coarsely, and almost longitudinally striate. Basal abdominal segment much broader than long; pygidial area two and one half times as long as broad, sides nearly parallel, and fully as broad at base as elsewhere, finely punctate. Length 14 mm.

♂. More slender; marked as in female but face mostly yellow and spots on the propodeum smaller; clypeus truncate below, surface nearly flat; hair-combs about twice their length apart; enclosure striate on sides, smooth in middle, pygidial area broader near tip than at base, coarsely punctate; femora of front and mid pairs with black spot, hind femora largely black at tip, and also apical half of the hind tibia black. From Steele, N. Dakota, July 13 (Stevens).

Cerceris stevensi n. sp.

In general similar to *C. sayi* in marks, hair, punctuation, etc., having in addition a white spot above the base of mandibles, one on pleura below tegula, a broad band on the scutellum, spots on the propodeum very large, and the abdominal bands rather broader at lateral ends. The clypeal process is proportionally broader, but of the same general shape; the pygidial area is much broader at base than elsewhere. Length 16 mm. From Steele, N. Dakota., July 13 (Stevens).

Trielis alcione Bks.

A pair from Sheldon, N. Dakota, Aug. 10, (Stevens).

The male agrees with the type of *T. alcione*; the female, hitherto unknown, is black, marked with red and yellow; the vertex, base of mandibles, and basal joint of antennae are rufous; two spots on pronotum, three on the scutellum, line on postscutellum, large median spot on the propodeum as well as lateral marks, and four pairs of spots on the abdomen, all slenderly connected; venter wholly black; legs largely rufous; hair on venter white, that on dorsum largely tawny, hair on head and thorax mostly white. Length 22 mm.

My table of the females (Bull. Mus. Comp. Zool. LXI, 112) may be changed as follows to include *alcione*.

3. A median yellow spot on propodeum; transverse frontal suture straight; the anterior ocellus not twice its diameter from the suture; spots of abdomen connected 4
- No median spot on propodeum; transverse frontal suture sinuate; anterior ocellus fully twice its diameter from the suture; spots of abdomen separated 5
4. Thorax and abdomen largely black; venter unspotted *alcione*
Thorax and abdomen largely rufous; venter with a pair of spots on third segment *regina*
5. Insect mostly rufous; fore wings with a dark streak near the tip; hair on abdomen above and below golden *xantiana*
Insect largely black, the streak of fore wing reaching nearer to base; hair on dorsum of abdomen much darker than that below *octomaculata*
(*lupina*).

NEW APPOINTMENTS TO THE ENTOMOLOGICAL BRANCH

Mr. E. R. Buckell was appointed Assistant Entomologist on November 27th, 1922. He is attached to the Division of Field Crop and Garden Insects. Mr. Buckell received his B. A. from Cambridge (Eng.) in 1911. Subsequent to the war he was engaged by the British Columbia Department of Agriculture on insects affecting the range.

Mr. C. R. Twinn was appointed Junior Entomologist on September 14th, and is attached to the Division of Field Crop and Garden Insects. Mr. Twinn received his B. S. A. from O. A. C. in 1922, and was engaged in a temporary capacity on the European Corn Borer work at Port Stanley during the past summer.

Mr. R. H. Painter has recently been appointed Junior Entomologist and attached to the above Division. Mr. Painter graduated from O.A.C. in 1922. During the summers of 1921 and 1922 he was engaged on the European Corn Borer work.

Mr. R. Glendenning received his permanent appointment as Junior Entomologist on September 14th, 1922. He has been employed at the Agassiz, B. C. laboratory since April, 1921. Mr. Glendenning has received special training in horticulture at the Experimental Gardens of the Royal Horticultural Society in England and has engaged in nursery work in Canada. He is particularly well fitted to investigate fruit insects, at which work he is now engaged.

ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO, 1922.

The Annual Meeting of the Entomological Society of Ontario for the year 1921—22 was held at the Ontario Agricultural College, Guelph, on Friday and Saturday, November 24th and 25th.

The general meetings of the society were held in the lecture room of the Department of Entomology. On Friday evening a dinner was held in the College cafeteria, after which the members and visitors adjourned to the Common Room of Mills Hall for a smoker and social evening, when the President, Mr. Morris, read an interesting paper on a collecting trip to Rondeau Park and Point Pelee.

The meetings were well attended by members of the Society and by visitors from the Ontario Agricultural College and others.

The following program was presented:—

Moving picture film, "The European Corn Borer,"—Ontario Provincial Motion Picture Bureau.

"The Spread of the Corn Borer in 1922," (10 minutes)—L. S. McLaine, Dominion Entomological Branch, Ottawa.

"Further Notes on the Life History of the European Corn Borer," (10 minutes)—G. J. Spencer, Ontario Agricultural College, Guelph.

"Revised Control Measures for European Corn Borer," (15 minutes)—H. G. Crawford, Dominion Entomological Branch, Port Stanley.

Discussion on European Corn Borer.

"The Economic Importance of Insects as Food for our Common Whitefish,"—Dr. W. A. Clemens, University of Toronto, Toronto.

"The Haunts and Habits of *Somatochlora*," (15 minutes)—Dr. E. M. Walker, University of Toronto, Toronto.

"Mechanical Devices used in Control of the Strawberry Root Weevil," (15 minutes)—W. Downes, Dominion Entomological Branch, Victoria.

"Provancher, His Life and Works," (10 minutes)—George Maheux, Department of Agriculture, Quebec.

- "Observations on the Oviposition of *Senotainia trilineata* V. der Wulp. (Tachinidae)," (5 minutes)—C. H. Curran, Dominion Entomological Branch, Ottawa.
- "Insects of the Season in Quebec," (10 minutes)—George Maheux, Department of Agriculture, Quebec.
- "The Relationship of Biological and Taxonomic Studies of Syrphidae (Diptera)," (10 minutes)—C. H. Curran, Dominion Entomological Branch, Ottawa.
- "Insects of the Season in Ontario," (10 minutes)—Prof. L. Cæsar, Ontario Agricultural College, Guelph, and W. A. Ross, Dominion Entomological Branch, Vineland Station.
- "Notes on *Frankliniella tritici* Fitch,"—R. C. Treherne, Dominion Entomological Branch, Ottawa.
- "Biologic Notes on two Buprestid Beetles (*Agrilus ruficollis* and *A. politus*)," (10 minutes, lantern)—C. B. Hutchings, Dominion Entomological Branch, Ottawa.
- "The Outbreak of Grape Leaf-Hoppers," (15 minutes)—W. A. Ross and W. Robinson, Dominion Entomological Branch, Vineland Station.
- "The Feather Mite,—a New Poultry Pest," (10 minutes)—Prof. L. Cæsar, Ontario Agricultural College, Guelph.
- "Some Observations on the Oviposition of *Hypera punctata*," (5 minutes)—H. F. Hudson, Dominion Entomological Branch, Strathroy.
- "Recent Developments in the Dominion Entomological Service," (20 minutes, lantern)—Arthur Gibson, Dominion Entomological Branch, Ottawa.
- "The Sunflower Maggot," (10 minutes)—J. E. Brink, Ontario Agricultural College, Guelph.
- "Recent Work on the Rose Chafer," (15 minutes)—W. A. Ross, and J. A. Hall, Dominion Entomological Branch, Vineland Station.
- "The Occurrence of the Potato Seed Maggot, *Hylemyia trichodactyla* in Ontario," (5 minutes)—G. H. Hammond, Dominion Entomological Branch, Ottawa.

The officers of the society were re-elected save that Mr. J. A. Flock was elected curator in place of Mr. Spencer.

ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF AMERICA

The seventeenth annual meeting of the Entomological Society of America was held in Boston, Massachusetts, in the buildings of the Massachusetts Institute of Technology, on December 26th, 27th, and 30th, 1922. The meetings were unusually well attended, the attendance ranging from about seventy-five to two hundred and fifty in the different sessions.

Seventy-four new members were elected during the past year, bringing the total membership to 652, the largest in the history of the Society.

The following officers were elected:

President: Prof. T. D. A. Cockerell, University of Colorado, Boulder, Col.

First Vice-Pres.: Dr. Wm. S. Marshall, University of Wisconsin, Madison, Wis.

Second Vice-Pres: Dr. F. E. Lutz, American Mus. of Nat. Hist., New York City.
Secretary-Treasurer: Dr. C. L. Metcalf, University of Illinois, Urbana, Ill.

Managing Editor of Annals: Prof. Herbert Osborn, Ohio State University, Columbus, Ohio.

Additional members of Executive Committee: Arthur Gibson, Dominion Entomologist, Ottawa, Canada; Dr. Wm. A. Riley, University of Minn., St. Paul, Minn.; Prof. R. A. Cooley, Agr. Experiment Sta., Bozeman, Mont.; Charles W. Johnson, Boston Soc. of Nat Hist., Boston, Mass.; Dr. E. P. Felt, State Entomologist, Albany, New York; Prof. A. L. Melander, State College, Pullman, Wash.

The Society voted to raise the annual dues from \$2.00 to \$3.00, effective January 1st, 1924.

Professor J. J. Davis, of Purdue University, was appointed Treasurer of the Thomas Say Foundation, to succeed Doctor E. D. Ball, resigned.

Messrs. R. A. Cooley, R. W. Harned, and Guy C. Crampton were elected as new members of the Editorial Board of the Annals.

The Society approved the constitution for the Union of American Biological Societies, as published in Science for September 29, 1922, and appointed A. N. Caudell and A. G. Boving as the representatives of the Society to attend such meetings as may be called in Washington during the coming year.

The following subject was selected for the Symposium at the Cincinnati meeting in 1923: "Methods of Protection and Defence Among Insects."

Mailed Saturday March 3rd, 1923.

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